

*IN THE UNITED STATES PATENT AND TRADEMARK OFFICE*

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In re Patent Application of:  
NEOH, et al.

Application No.: 09/895,153

Confirmation No.: 9536

Filed: July 2, 2001

Art Unit: 1762

For: PHOTOINDUCED CONVERSION OF  
POLYANILINE FROM AN INSULATING  
STATE TO A CONDUCTING STATE

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Examiner: Elena TSOY

**REPLY BRIEF**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This refers to the Examiner's Answer dated April 5, 2007.

The sole claim on appeal recites four steps, as follows:

- a) providing a vinyl benzyl halide grafted film substrate;
- b) reacting the vinyl benzyl halide grafted film with an equimolar mixture of 4,4' bipyridine and p-xylene dihalide to form a viologen salt-grafted film;
- c) coating the viologen salt-grafted film with polyaniline to form a polyaniline-coated film; and
- d) exposing the polyaniline-coated film to near-ultraviolet radiation to obtain an electrically conductive polymer.

In the paragraph bridging pages 4-5 of the Examiner's Answer, the Examiner summarizes the teachings of the primary reference, Sato, as follows:

Sato et al *fails to teach* that (i) chloromethylated polystyrene (i.e. a polymer having a polyethylene backbone and pendant benzyl chloride groups) can be obtained not only by chloromethylating a phenyl-containing polystyrene but also by grafting vinyl benzyl chloride onto non-phenyl-containing polymer such as polyethylene;

- (ii) a) [Sato et al *fails to teach* that] the first viologen polymer film is formed by reacting a 4,4' bipyridyl monoaralkyl halide compound with a chloromethylated polymer film substrate; and
- b) [Sato et al *fails to teach* that] an equimolar mixture of 4,4'bipyridine and p-xylene dihalide is used instead of the 4,4' bipyridyl monoaralkyl halide compound;
- (iii) [Sato et al *fails to teach* that] instead of polyvinyl alcohol, polyaniline can be used as electron donor for coating the viologen salt layer.

Examiner's Answer, paragraph bridging pages 4-5 (emphasis supplied). Thus, for Appellants' four-step process, the Examiner identifies four different features that the Sato reference "fails to teach."

As pointed out in detail in Appellants' principal Brief, almost every feature of the Sato composition is changed to obtain the present invention. It is unrealistic to contend that a person of ordinary skill in the art, starting from the Sato disclosure, would have located the Pohl, Williams, and Beratan teachings and then modified the Sato technology as proposed by the Examiner *in the absence of Appellants' guidance*.

At the bottom of page 5 of the Examiner's Answer, the Examiner contends that by reacting a 4,4'-bipyridyl monoaralkyl halide with a benzyl chloride grafted polymer in the presence of a substrate "at least some" of the benzyl grafted polymer would be deposited as a film on the substrate, thereby forming a benzyl chloride grafted film substrate. The Examiner contends further that the 4,4'-bipyridyl monoaralkyl halide compound would react with the benzyl chloride grafted film substrate (allegedly as required by claim 36). What the Examiner is proposing here is a physical coating of benzyl chloride-grafted polymer on a substrate. This is very different from the technology of claim 36, in which vinyl benzyl halide units are grafted (chemically attached) to the substrate.

At the top of page 8 of the Examiner's Answer, the Examiner contends that Figure 4b of Beratan shows that the methyl viologen acceptor is covalently attached to a film substrate having grafted benzyl groups. The Examiner admits that Beratan does not disclose how the covalent attachment is accomplished, and the Examiner assumes that customary methods were used. The square bracket of Figure 4b does not imply attachment to a substrate. Instead it implies a repeating monomeric unit. Beratan states that his polymer 22 comprises a plurality of monomeric units (col. 4, line 25) and that each unit comprises at least 3 different monomers, the

donor, the intermediate, and the acceptors (col. 2, line 14). Furthermore, the attachment of the polymer 22 to an electrode is described, in lines 38-41 of column 7, as being via “a deposition using directional shadowing, and then using the activated area as an electrode to form a covalent bond with a group such as a silyl at the head end of the polymer chain”. In this case, the polymer is first formed (typically 600 polymer units long – col. 7, line 35) and then attached to the substrate via groups such as silyl. In contrast, in claim 36 the vinyl benzyl halide units are first grafted and then the viologen polymer is grown from these units via the reaction of 4,4'-bipyridine and p-xylene dihalide.

On page 11 of the Examiner's Answer, the Examiner argues that “a polymeric material of Sato et al in view of Williams et al in view of Beratan et al [is] ***a composition actually disclosed in the prior art***”. (Emphasis in original.) (Query: what about Pohl? What role does the Pohl disclosure play in disclosing Appellants' composition?) Appellants recognize that Sato discloses certain compositions in JP 56-26977 and Williams discloses other compositions in US 4,414,080 and Beratan discloses yet other compositions in US 5,016,063. In what document do Sato and Williams and Beratan disclose a polymeric material of the present invention?

In her discussion of inherency on page 11 of the Examiner's Answer, the Examiner cites sections 2111.02 and 2112.01 of the Manual of Patent Examining Procedure (MPEP). It is not clear why she cites MPEP 2111.02, which is entitled “Effect of Preamble”. MPEP 2112.01 does discuss inherency, but the context of the discussion indicates that inherency is a consideration where a claim is rejected over a single reference, ***not over a combination of references***. To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. *In re Robertson*, 169 F.3d 743, 49 USPQ2d 1949 (Fed. Cir. 1999). See also *Transclean Corp. v. Bridgewood Serv. Inc.*, 290 F.3d 1346, 62 USPQ2d 1865 (Fed. Cir. 2002). Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing ***may*** result from a given set of circumstances is ***not*** sufficient. *Scaltech Inc. v. Retec/Tetra L.L.C.*, 156 F.3d 1193, 51 USPQ2d 1055 (Fed. Cir. 1999).

In the principal Brief, Appellants had pointed out that electron transfer, to which the Examiner has referred, is the mechanism of an oxidation-reduction reaction, and that electron

transfer does not imply conduction – that is, movement of electrons through a material under the influence of a voltage gradient. Appellants provided evidentiary publications by Kamogawa et al., Sampanthar et al., and Ogawa et al. in support of this clarification of technology. The Examiner fails to give any detailed consideration to the evidence proffered by Appellants.

The Examiner continues to maintain, on page 11 of the Examiner's Answer, that it does not matter whether she is right or wrong with respect to whether electron transfer is the same as electroconductivity. *To the contrary, the invention lies in achieving the latter rather than the former.* The Examiner is wrong. Accordingly, the Board should adopt Appellants' position that the references assembled by the Examiner make no suggestion of irradiating an article comprising polyaniline and viologen to obtain a conductive material.

For at least the reasons explained in the Brief on Appeal filed in this application on December 29, 2006, the combination of Sato JP '977, Pohl '233, Williams et al. '080, and Beratan '063 fails to place the subject matter of claim 36 in the possession of persons of ordinary skill in the art. Accordingly, the rejection of claim 36 under 35 U.S.C. § 103(a) over these references is improper and should be reversed.

If there are any questions concerning this application, the Examiner and/or the Board is/are respectfully requested to contact Richard Gallagher (Reg. No. 28,781) at (703) 205-8008.

Dated: June 5, 2007

Respectfully submitted,

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